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ABSTRACT

The fiscal year 2000 Alumni Survey at a large, substantially online university was used to assess undergraduate students' satisfaction with both online and face-to-face academic quality and student services. Students who had taken online classes evaluated both their online and face-to-face classes. In addition, students who took only face-to-face classes evaluated them. Responses were received from 567 graduates, representing a 31% response rate. Differences between the online and face-to-face students' ratings of face-to-face academic quality raised questions about the significance of context for self-reported data. Several of the differences in rating actually favored face-to-face among students who took only one online course. However, when students took four or more online courses, they rated their online classes as superior in their satisfaction with such key academic quality indicators as "develop critical thinking" and "rigor and scholarship." Other measurement issues related to whether online and face-to-face classes should be compared are discussed. One appendix contains a survey overview, and the other contains the survey. (Contains 6 tables and 17 references.) (SLD)

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Comparing Online and Face-to-Face Instruction at a Large Virtual University: Data and Issues in the Measurement of Quality

Abstract

The FY 2000 Alumni Survey at a large, substantially online university was used to assess undergraduate students' satisfaction with both online and face-to-face academic quality and student services. Students who had taken online classes evaluated both their online and face-to-face classes. Additionally, students who took only face-to-face classes evaluated them. Differences between the online and face-to-face students' ratings of face-to-face academic quality raised questions about the significance of context for self reported data. Other measurement issues relating to whether online and face-to-face classes should be compared are discussed.

Comparing Online and Face-to-Face Instruction at a Large Virtual University: Data and Issues in the Measurement of Quality

Introduction

Outcome Assessment

Interest in assessment at institutions of higher education, while important for decades, has recently surged. For example, the Middle States Commission on Higher Education recently offered a paper on the *Characteristics of Excellence: Standards for Accreditation* (2001), which concludes with a section on educational effectiveness. In the chapter on institutional assessment, the Middle States Commission notes that outcomes assessment has two purposes: "accountability" and "effectiveness". The Commission goes on to say:

> External forces and internal priorities require institutions of higher education to demonstrate their effectiveness and efficiency to students and the broader public as well. (pg. 43)

Effectiveness can be explored at both the micro level (e.g., student learning) and at the macro level (e.g., institutional effectiveness). One tool for studying institutional effectiveness and quality is the university's alumni survey. In the Middle States Commission's *Characteristics of Excellence*, they list a number of such tools and documents to use in the analysis and documentation of an institution's excellence. "Analysis of student satisfaction survey results" is listed as an assessment tool to help an institution perform outcome assessment and evaluate its overall effectiveness. (pp. 43-44)

Growth in Alternative Delivery Formats and Non-Traditional Institutions

The surge in interest in assessment at higher education institutions may, at least in part, flow from the surge in interest and growth in alternative education delivery formats and non-traditional institutions. For example, much publicity heralded the birth of the non-traditional Western Governor's University, and it was given a special position in the Department of Education's Distance Education Demonstration Project. Moreover, students have been "voting" for the new online delivery formats with their registrations. Online enrollment growth at the University of Maryland University College has been in double and triple digits in recent years and has grown at a fifty percent rate in FY 2001 over a large base in FY 2000. UMUC's worldwide enrollments/duplicated registrations have reached 60,000 worldwide. Other non-traditional institutions (e.g., for-profit degree-granting) have also moved into the online arena.

Specific Research Question

This paper focuses on comparing student satisfaction with online and face-to-face instruction at a large university that currently has about half of its undergraduate enrollments/registrations online. Because online students are not segregated into special continuing education schools or specifically-online colleges, many students are actually "mixed," (i.e., they can take both online and face to face classes at the same time or over the course of their academic career). Students who take online classes may take only one class online or, at the other end of the spectrum, take all of the classes they need for their bachelor's degree online. Thus, it is possible to compare online students', who could be

described as "mixed" format students, evaluations of both their online classes and their face-to-face classes in a series of questions in the Bachelor's Alumni Survey. Rather than simply comparing students' assessment of their online and face-to-face classes, we analyzed the results in terms of the number of online classes the students had taken. Three levels were examined: students who had taken only one online course; students who had taken two or three online courses; and students who had taken four or more online courses.

Research Design

The FY2000 Alumni Survey, conducted one year after graduation, was used to assess FY 1999 bachelor's degree recipients' satisfaction with both online and face-to-face academic quality indicators as well as satisfaction with the quality of student services. We compared students taking online and face-to-face classes ratings of both their face-to-face classes and their online classes.

In a university that provides face-to-face, online and some other types of distance classes and where students can enroll in different delivery formats during the same semester or over time, students may have a different view of distance and face-to-face classes at different times during the course of their enrollment. After the degree is awarded, students have perceptions about their online and face-to-face education. The alumni survey provides a good vehicle to measure students' perceptions and satisfaction with their online and face-to-face educational experience at their alma mater. Analysis of students' self-reported data on their satisfaction with online and face-to-face classes is an important assessment tool for a university's self-study. The matched pair t-test was used

to assess whether there was significant difference between how alumni rated their face-to-face classes and their online classes.

In "Quality On the Line: Benchmarks for Success in Internet-Based Distance Education" (1999), the report prepared with the support of the National Education Association and Blackboard, Inc., Phipps and Merisotis recommend as a benchmark that:

> The program's educational effectiveness and teaching/learning process [be] assessed through an evaluation process that uses several methods and applies specific standards. (pg. 16)

The alumni survey provides one method of assessing the effectiveness and quality of the face-to-face and online teaching/learning process. Other assessment processes are normal testing, writing and portfolio assignments, and teacher/course evaluations.

Methodology

The main objective of this study was to compare students' level of satisfaction with face-to-face and online instruction. Furthermore, we analyzed the relationship between student satisfaction and the number of online classes in which a student had enrolled.

Data Collection and Indicators

All bachelor's level students who graduated stateside[1] (n=1,802) during FY 1999 (i.e., summer 1998, fall 1998, and spring 1999) were sent an Alumni Survey in the spring of 2000. There were 567 respondents, representing a 31% response rate. (See Appendix A for a demographic comparison of the respondents and the FY 1999 graduates.) The survey contained fourteen items measuring the excellence or quality of the academic

program (see Table 1) and nine items measuring the quality of the delivery of student services and support (see Table 2). Alumni were asked to rate each item on a five-point Likert scale where 1 equaled "Very Dissatisfied" and five equaled "Very Satisfied." Higher mean scores thus represented higher levels of satisfaction with academic quality and student services.

Among the total 567 bachelor's level respondents, 330 alumni rated both their face-to-face and online courses. An additional 232 alumni took only face-to-face courses and thus rated only face-to-face classes on the twenty-three quality and effectiveness indicators. (Note: Five respondents did not respond to these questions about quality and effectiveness; i.e., item nonresponse, thus explaining the discrepancy between the 567 total respondents and the 562 respondents used for analysis.) Alumni were asked to indicate their satisfaction with their alma mater's performance on each of the items. See Appendix B for an example of the original questions.

Comparing Means: Matched Pairs T-Test

For each of the twenty-three quality/effectiveness indicators, only alumni who evaluated both online and face-to-face classes were used. For each assessment item, the respondent's mean satisfaction ratings for online classes was calculated separately from their mean satisfaction ratings for their face-to-face classes. In order to evaluate the research objective as to whether alumni reported any significant difference between their online and face-to-face ratings, a matched t-test was calculated. For each item, the mean of the differences between respondent's ratings of online and face-to-face classes was calculated. To calculate the t-statistics for matched samples, mean of the differences

between online and face-to-face ratings is divided by the standard error. The p value of the test was determined. A decision was then made for each item as to whether the difference between the online and face-to-face classes was statistically significant and thus whether alumni rated online and face-to-face classes differently on that quality and effectiveness indicator.

Hypotheses and tests

H_0: true mean difference is zero (i.e., $\bar{d} = 0$)

H_a: true mean difference is not equal to zero (i.e., $\bar{d} \neq 0$).

The test statistic

$$t = \frac{\bar{d} - 0}{s(\bar{d})}$$

In the above formula,

$\bar{d}$ = the mean of the differences between each respondents' satisfaction ratings for online classes and face-to-face classes for each quality indicator.

$s(\bar{d})$ is the standard error of the mean differences .

Where $s(\bar{d}) = s_d / \sqrt{n}$.

Where $s_d = \sqrt{(\Sigma(di - \bar{d})^2) / n-1}$

Analysis of Level of Online Enrollment

To evaluate the second stated objective, the students who took the online courses were classified into three groups: (a) alumni who had taken only one online course, (b) alumni who had taken two or three online courses, and (c) alumni who had taken four or

more online courses. Means for each quality indicator were calculated for each category of online enrollment. The online mean ratings of students within each category were compared to their face-to-face ratings and differences were calculated. The matched t-test for differences between the mean levels of satisfaction for each quality indicator was calculated for both the online and face-to-face ratings of instruction and student services. Decisions were made regarding whether the differences were statistically significant at the .05 level.

Survey Items

In addition to many standard questions, students were presented with a set of questions that asked them about their ratings of specific criteria of academic quality. Many of these questions are also included in the U.S. Department of Education's Distance Education Demonstration Project Distance Education Survey.

Results and Discussion

Rating Online and face-to-face Classes:
Matched Pair T-Test for Significant Differences

Table 1 presents the results of a matched-pairs t-test of online students rating online and face-to-face courses. Results are presented for the mean for each item for the alumni's online classes and the alumni's face-to-face classes. The mean differences between respondents' ratings of their online and face-to-face classes are shown. The matched sample t-test for the difference of means is calculated and the p value is determined. The .05 level was used as the cut off level for significance.

Table 1 lists the mean of the differences in responses between online and face-to-face courses regarding the levels of satisfaction for each of the fourteen criteria. Out of these fourteen indicators for quality in academic programs, we found that the mean of the differences were statistically significant at $p <= .05$ for twelve of the indicators. Among the twelve significant indicators, the mean of the differences for ten criteria were negative and the negative values indicate that the levels of satisfaction on face-to-face instruction were higher, as compared to the levels of satisfaction on online instruction. On two criteria, 'flexibility of courses' and 'course availability', the levels of satisfaction for online instruction were significantly higher as compared to the ratings of face-to-face instruction. No statistically significant differences in the level of satisfaction were found in 'develop critical thinking' or 'rigor and scholarship' in Table 1. Table 1 includes all students who took 1 or more online class and who also evaluated their face-to-face classes.

Regarding services and support, the mean for the differences of 'availability of career planning services' ($p= .0324$) was the only indicator that was statistically significant, and alumni rated face-to-face delivery higher than online. No significant differences were found on any other service dimensions, indicating that the students were equally satisfied with the online delivery they received.

Table 1

Matched t-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of Their Face-to-Face and Online Classes' Academic Quality

Academic Indicator	n	Mean		Mean Difference	Standard Error	P-value
		Face-to-Face	Online			
Content of curriculum	236	4.254	4.089	-0.165	0.048	0.0008*
Quality of education	240	4.279	4.009	-0.270	0.057	<0.0001*
Timeliness of feedback	237	4.248	3.856	-0.392	0.062	<0.0001*
Testing and grading	238	4.239	3.975	-0.264	0.058	<0.0001*
Faculty knowledge	236	4.305	4.132	-0.173	0.055	0.0019*
Faculty teaching skills	238	4.134	3.853	-0.281	0.068	<0.0001*
Academic advising	207	3.748	3.478	-0.270	0.061	<0.0001*
Develop critical thinking	235	4.055	4.004	-0.051	0.054	0.3469
Rigor and scholarship	226	3.911	3.854	-0.057	0.051	0.2641
Student-faculty interaction	236	4.139	3.652	-0.487	0.069	<0.0001*
Student-student interaction	232	4.103	3.457	-0.646	0.070	<0.0001*
Flexibility of courses	236	3.995	4.245	0.250	0.067	0.0003*
Course availability	235	3.829	4.126	0.297	0.064	<0.0001*
Relevance to career	237	4.202	4.059	-0.143	0.049	0.0041*

Table 2

Matched t-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of
Face-to-Face and Online Services and Support

Services and Support	N	Mean		Mean Difference	Standard Error	P-value
		Face-to-Face	Online			
Availability of computer laboratories	154	4.045	3.948	-0.097	0.055	0.0833
Availability of tutoring services	105	3.457	3.391	-0.066	0.054	0.2247
Availability of career planning services	113	3.230	3.142	-0.088	0.040	0.0324*
Availability of computer training/information literacy	146	3.671	3.603	-0.068	0.044	0.1232
Availability of library and other learning material	179	4.039	3.967	-0.072	0.038	0.0577
Ease of registration	220	4.581	4.612	0.031	0.028	0.2633
Availability of technical assistance	173	3.913	3.890	-0.023	0.057	0.6904
Co-op services and support	92	3.847	3.771	-0.076	0.038	0.0517
Excel services and support	83	3.831	3.735	-0.096	0.055	0.0881

Table 3 and Table 4 present the results of matched-pairs t-test for three levels of enrollment in online courses.

Students taking only 1 online course

Table 3 lists the mean of the differences in responses between online and face-to-face courses regarding the levels of satisfaction for each of the fourteen criteria. Out of fourteen criteria regarding academic quality, the mean of the differences were statistically significant at p<=.05 for twelve criteria. The mean of the differences for all twelve criteria were negative and the negative values indicate that the levels of satisfaction on face-to-face instruction were higher, as compared to the levels of satisfaction on online instruction. No statistically significant difference in the level of satisfaction was found in 'flexibility of courses' or 'course availability' criteria.

Regarding services and support (Table 4), the mean of the differences of 'availability of career planning services' (p=.0486) was the only criteria that was found statistically significant, and it was scored higher on face-to-face than online. No significant difference was found on any other criteria.

Students taking 2 - 3 online courses

Out of fourteen criteria regarding education, the mean of the differences were statistically significant at p<=.05 for eleven criteria. Among the eleven significant criteria, the mean of the differences for ten criteria were negative and the negative values indicate that the levels of satisfaction on face-to-face instruction were higher, as compared to the levels of satisfaction on online instruction. On the criteria 'course availability', the level of satisfaction for online instruction was significantly higher

compared to the level for face-to-face instruction. No statistically significant difference in the level of satisfaction was found in 'develop critical thinking', 'rigor and scholarship' or 'flexibility of courses criteria.'

In Table 4, regarding services and support, the mean of the differences of three criteria 'availability of computer laboratories' (p=.0219), 'availability of tutoring services' (p=.0188), and 'availability of library and other learning materials' (p=.0111) was found statistically significant, and they were scored higher on face-to-face than online. No significant difference was found on the other criteria.

Students taking 4 or more online courses

Out of fourteen criteria regarding academic quality, the mean of the differences were statistically significant at p<=.05 for five criteria. Among the five significant criteria, the mean of the differences for 4 criteria were positive and the positive values indicate that the levels of satisfaction on online instruction were higher, as compared to the levels of satisfaction on Face-to-Face instruction. The four significant criteria were: 'develop critical thinking' (p=.0023), 'rigor and scholarship' (p=. 0142), 'flexibility of courses' (p=<.0001) and 'course availability' (p=.0009). On the criteria 'student-student interaction' (p=<0.0009)', the levels of satisfaction on face-to-face instruction were significantly higher compared to the levels on online instruction. No statistically significant difference in level of satisfaction was found on any other academic or student service delivery dimension.

Table 3

Matched t-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of Their Face-to-Face and Online Classes' Academic Quality

Three Levels Based Upon Number of Online Course Enrollments

Academic Indicator	1 Online Course		2 – 3 Online Courses		4 or More Online Courses	
	Mean differences (n)	P value[1]	Mean differences (n)	P value[1]	Mean differences (n)	P value
Content of curriculum	-0.372 (43)	0.0062*	-0.259 (81)	<.0001*	0.121 (82)	0.1235
Quality of education	-0.590 (44)	0.0005*	-0.428 (84)	<.0001*	0.073 (82)	0.3577
Timeliness of feedback	-0.720 (43)	0.0006*	-0.385 (83)	<.0001*	-0.172 (81)	0.0657
Testing and grading	-0.558 (43)	0.0021*	-0.285 (84)	0.0010*	-0.073 (82)	0.4420
Faculty knowledge	-0.441 (43)	0.0087*	-0.301 (83)	0.0002*	0.060 (82)	0.5320
Faculty teaching skills	-0.651 (43)	0.0017*	-0.361 (83)	0.0007*	0.060 (82)	0.5505
Academic advising	-0.611 (36)	0.0031*	-0.333 (69)	0.0009*	-0.065 (76)	0.4787
Develop critical thinking	-0.477 (44)	0.0057*	-0.148 (81)	0.0573	0.271 (81)	0.0023*
Rigor and scholarship	-0.512 (41)	0.0014*	-0.116 (77)	0.1290	0.212 (80)	0.0142*
Student-faculty interaction	-0.813 (43)	0.0002*	-0.686 (83)	<.0001*	-0.148 (81)	0.1527
Student-student interaction	-0.930 (43)	<.0001*	-0.756 (82)	<.0001*	-0.379 (79)	0.0009*
Flexibility of courses	-0.113 (44)	0.5141	0.172 (81)	0.1274	0.543 (81)	<.0001*
Course availability	0.000 (43)	1.0000	0.308 (81)	0.0029*	0.419 (81)	0.0009*
Relevance to career	-0.444 (45)	0.0061*	-0.268 (82)	0.0007*	0.074 (81)	0.1093

Table 4

Matched t-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of
Face-to-Face and Online Services and Support

Three Levels Based Upon Number of Online Course Enrollments

Services and Support	1 Online Course		2 – 3 Online Courses		4 or More Online Courses	
	Mean differences (n)	P value[1]	Mean differences (n)	P value[1]	Mean differences (n)	P value
Availability of computer laboratories	-0.103 (29)	0.3256	-0.222 (54)	0.0219*	0.054 (55)	0.6061
Availability of tutoring services	-0.266 (15)	0.2170	-0.210 (38)	0.0188*	0.119 (42)	0.1333
Availability of career planning services	-0.411 (17)	0.0486*	-0.052 (38)	0.4215	-0.021(47)	0.5693
Availability of computer training/information literacy	-0.260 (23)	0.0557	-0.125 (48)	0.1825	0.070 (57)	0.2087
Availability of library and other learning material	-0.033 (30)	0.7450	-0.175 (57)	0.0111*	0.000 (68)	1.000
Ease of registration	-0.026 (38)	0.7108	-0.013(74)	0.8102	0.075 (79)	0.1093
Availability of technical assistance	-0.125 (32)	0.4882	-0.145 (62)	0.1511	0.155 (58)	0.0599
Co-op services and support	-0.133 (15)	0.3343	-0.138 (36)	0.0576	0.033 (30)	0.3256
Excel services and support	-0.200 (10)	0.3434	-0.156 (32)	0.1691	0.034 (29)	0.5728

Rating Face-to-Face Classes - Methodological Implications:
Students taking Online classes and Students taking only Face-to-Face Classes

The rating of face-to-face classes can be compared for students taking online classes (mixed students) and students taking only face-to-face classes. This comparison is not typically done since the focus is usually upon the online classes or comparing online and face-to-face classes. This approach is valuable as a tool for identifying what we have called the "Dartmouth Effect." When theoretical discussions about quality and standards attempt to compare online and face-to-face classes, the online classes are compared to a theoretical face-to-face ideal. In other words, the online class is compared not to the reality of the large lecture hall class of 100 to 800 students, or to a small class with an instructor who mainly lectures, but rather to an idealized, small face-to-face class with substantial discussion. In other words, a stereotypical Dartmouth-style classroom setting. We hypothesize that the same idealization occurs when alumni students who have taken both online and face-to-face classes remember and rate their face-to-face classes in the Alumni Survey. We hypothesized that students who were rating their online experience would tend to inflate the scores of their face-to-face classes and would have higher ratings on all quality and service ratings items for their face-to-face classes than the students just rating face-to-face classes.

Ho: $\mu_1 - \mu_2 \leq 0$

Ha: $\mu_1 - \mu_2 > 0$

μ_1 =mean ratings of face-to-face classes by alumni who have taken online classes.

μ_2 = mean ratings of face-to-face classes by alumni who have taken only face-to-face classes.

We test these hypotheses by using the z-test statistic. We use .05 as the level of significance required to reject the null hypothesis.

Items on which *online* students rated face-to-face classes significantly higher than face-to-face students were: 'timeliness of feedback', 'rigor and scholarship', 'student-faculty interaction', and 'student-student interaction.'

Items on which online students rated face-to-face classes higher *but which only reached the .10 level of significance* (i.e., not high enough to reject the null hypothesis) were: 'academic advising' and develop critical thinking.'

For the convenience items, 'flexibility of courses' and 'course availability', we hypothesize that online students will rate face-to-face classes lower than alumni who have taken only face-to-face classes.

Ho: $\mu_1 - \mu_2 \geq 0$

Ha: $\mu_1 - \mu_2 < 0$

Alumni who had taken online classes rated face-to-face *classes significantly lower than face-to-face students* in terms of 'flexibility of course'. Table 5 lists all of the quality items with the mean ratings of face-to-face classes by the two comparison groups: 1) alumni who had taken online and face-to-face classes and rated them both, and 2) alumni who had taken only face-to-face classes and thus rated only face-to-face classes. See Table 5 for the p-value for the one-tailed test. See Table 6 for a list of all the services and support items with the mean ratings of face-to-face classes by the above two comparison groups.

For the services and support items, the hypotheses were:

Ho: $\mu_1 - \mu_2 \leq 0$

Ha: $\mu_1 - \mu_2 > 0$

(μ_1 =mean ratings of face-to-face classes by alumni who have taken online classes. μ_2 = mean ratings of face-to-face classes by alumni who have taken only face-to-face classes.

We tested these hypotheses by using the z-test statistic. We used .05 as the level of significance required to reject the null hypothesis. See Table 6 for the p-value for the one-tailed test. Items on which online students rated face-to-face services and support significantly higher than face-to-face students were: 'availability of technical assistance', 'co-op services and support', and 'Excel services and support'.

The higher evaluation of face-to-face classes by the online alumni as compared with face-to-face students provides some preliminary evidence that online students may unintentionally inflate their ratings of face-to-face classes. Just as when face-to-face classes are compared in the abstract to online classes, there is a tendency to idealize face-to-face classes, the same effect may be at work in general assessments such as in an alumni survey. Face-to-Face classes ratings may benefit among online students from the "Dartmouth Effect," whereby face-to-face classes are idealized to the stereotyped small, highly interactive discussion class. If such an effect were not at work, students rating online classes evaluations of their face-to-face class should not differ significantly from face-to-face students rating of their face-to-face classes. While these results are preliminary and need to be tested further in the future, they do raise methodological

questions about the problems of rating face-to-face classes and online classes in the same context.

Table 5

One-tailed z-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of
Face-to-Face Classes' Academic Quality

Academic Indicator	Online Students Evaluating F-t-F			F-t-F Students Evaluating F-t-F			P(Z<=z) One tail
	Mean	Standard Error	n	Mean	Standard Error	n	
Content of curriculum	4.22	0.042	283	4.2	0.046	215	0.387
Quality of education	4.21	0.048	285	4.22	0.537	217	0.479
Timeliness of feedback	4.21	0.043	281	4.09	0.049	215	0.045*
Testing and grading	4.19	0.044	284	4.13	0.049	217	0.182
Faculty knowledge	4.26	0.047	283	4.20	0.055	216	0.215
Faculty teaching skills	4.10	0.055	283	4.06	0.055	217	0.335
Academic advising	3.78	0.066	271	3.63	0.076	206	0.067
Develop critical thinking	4.01	0.053	281	3.88	0.058	217	0.051
Rigor and scholarship	3.86	0.055	271	3.67	0.066	208	0.014*
Student-faculty interaction	4.06	0.054	280	3.87	0.057	216	0.008*
Student-student interaction	4.06	0.051	282	3.84	0.059	213	0.002*
Relevance to career	4.15	0.048	283	4.09	0.065	216	0.205

Items for which Students Rated Online Classes' Academic Quality
As Higher than that for Face-to-Face

Academic Indicator	Online Students Evaluating F-t-F			F-t-F Students Evaluating F-t-F			P(Z<=z) One tail
	Mean	Standard Error	n	Mean	Standard Error	n	
Flexibility of courses	4.01	0.050	282	4.14	0.055	217	0.041*
Course availability	3.84	0.058	282	3.94	0.069	217	0.124

Table 6

One-tailed z-test: Comparison of Mean Satisfaction

Alumni Students' Ratings of Face-to-Face Services and Support

Services and Support	Online Students Evaluating F-t-F			F-t-F Students Evaluating F-t-F			P(Z<=z) One tail
	Mean	Standard Error	N	Mean	Standard Error	N	
Availability of computer laboratories	3.99	0.059	225	3.96	0.070	183	0.379
Availability of tutoring services	3.42	0.067	149	3.30	0.082	132	0.130
Availability of career planning services	3.27	0.080	162	3.14	0.087	137	0.143
Availability of computer training/information literacy	3.56	0.064	194	3.48	0.082	146	0.235
Availability of library and other learning material	3.97	0.063	235	3.95	0.069	185	0.443
Ease of registration	4.59	0.038	271	4.61	0.047	212	0.326
Availability of technical assistance	3.85	0.059	214	3.48	0.073	164	0.00003*
Co-op services and support	3.81	0.095	130	3.27	0.102	106	0.00005*
Excel services and support	3.87	0.092	132	3.48	0.100	112	0.002*

Implications

The self-reported alumni satisfaction survey data has implications for both the assessment of quality in education and the importance of intervening variables in the assessment of quality of online education. Several of the differences in rating actually favored face-to-face among students who took only one online course. However, w*hen looking at students who took four or more online courses, they rated their online classes as superior in their satisfaction with such key academic quality indicators as : "develop critical thinking" and "rigor and scholarship."*

End Notes

1. University of Maryland University College operates three divisions globally: 1) a European division headquartered in Heidelberg, Germany, 2) an Asian division, headquartered in Tokyo, Japan, and 3) the Stateside division, operating locations in the Maryland-DC-Northern Virginia area, headquartered in Adelphi, Maryland. The 2000 Alumni Survey of 1999 Degree Recipients was conducted using a sampling of students receiving their degrees after completing programs administered by the Stateside division.

Appendix A

Survey Overview

Mailed: summer 2000
Number mailed to undergraduates: 1,802
Number of respondents: 567
Response rate: 31%

Comparison of Alumni Survey Respondents to the FY1999* Bachelor's Degree Recipient Population

Demographic	Alumni Survey Respondents	All Bachelor's Degree Recipients
Gender		
Male	42%	47%
Female	58%	53%
Ethnicity		
African-American	22%	24%
American Indian	0%	<1%
Asian	5%	7%
Hispanic	4%	4%
White	68%	63%
Unknown	1%	2%

*FY 1999 degree recipients received their degrees in August 1998, December 1998, and June 1999.

Appendix B

Questionnaire for Recent Graduates

Please use the following rating scale to answer **Question 41** and **Question 42**.

1	2	3	4	5	9
Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Dissatisfied	No opinion/Never taken a class in that format at UMUC

Please rate both Face-to-Face and Online classes that you have taken.

41. Please rate your UMUC education on each of the following criteria

	Face-to-Face	Online
Content of curriculum		
Quality of education		
Timeliness of feedback		
Testing and grading		
Faculty knowledge		
Faculty teaching skills		
Academic advising		
Develop critical thinking		
Rigor and scholarship		
Student faculty interaction		
Student student interaction		
Flexibility of course		
Course availability		
Relevance to career		

42. Please rate your satisfaction with UMUC's provision of the following services and support

	Face-to-Face	Online
Availability of computer laboratories		
Availability of tutoring services		
Availability of career planning services		
Availability of computer training /information literacy		
Availability of library and other learning material		
Ease of registration		
Availability of technical assistance		
Co-op services and support		
EXCEL services and support		

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